



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

U.S. Patent

Application of: K. SHIMIZU

Serial Number : 10/075,362

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For : CELLULOSE ESTER FILM, ITS MANUFACTURING  
METHOD, POLARIZING PLATE, AND LIQUID CRYSTAL  
DISPLAY

Group Art Unit: 1772

Examiner : Sow-Fun Hon

DECLARATION UNDER 37 C.F.R. 1.132

Hon. Commissioner of Patents  
and Trademarks  
Washington, D.C. 20231

Sir:

I, KUNIO SHIMIZU, hereby declare and say as follows:

That I am a post graduate from Hokkaido University  
having been awarded a Masters Degree in Technology in March  
1980.

That since April 1986, I have been employed by Konica  
Corporation, the owner of the above-identified application.  
During my employment, I have been engaged in the research  
and the study of polarizing plate materials in the Research  
and Development Laboratory of my company.

That I am a co-inventor of the present application.

That I am familiar with the subject matter of the  
present invention.

What follows is an accurate summary of experiments conducted according to my detailed instructions and under my personal supervision, and the results obtained therefrom.

#### Comparative tests

1. The present invention is distinguished from Van Every or Snaper in that the cellulose ester film comprises particles in an amount of from 0.0001 to 0.3% by weight. Van Every discloses a cellulose ester film (cellulose nitrate is a species of cellulose ester) (column 3a, line 50) comprising a compound represented by one embodiment of claimed formula (1) on the next page), in an amount of 3.89 % which is within the claimed range of 1 to 30 % by weight (column 3a, lines 30-35), in the form of dicyclohexyl phthalate, however, Van Every fails to disclose that the cellulose ester film comprises particles in an amount of from 0.0001 to 0.3% by weight. Snaper discloses inorganic crystals, for example, silicon oxide, to which the examiner also refers, however, Snaper fails to disclose the crystal content of the cellulose ester film. In view of the above, it would not have been obvious to one of ordinary skill in the art to attain the invention over in view of the cited references above.

2. In spite of the above, in order to further show the unexpected results of the invention, comparative tests were carried out employing the cellulose ester film derived from the disclosure of Van Every and Snaper, which was considered to be closest prior art.

3. A cellulose ester dope composition was prepared in the same manner as the composition disclosed in Example VI of Van Every, except that silicon dioxide particles with an average particle size of 0.2  $\mu\text{m}$  were added to give a particle content of 0.5% by weight in the cellulose ester film to be prepared. The resulting dope was processed in the same manner as in cellulose ester film sample 1 of Example 1 of the present Specification. Thus, cellulose ester film sample 1-1 (comparative) was prepared.

A cellulose ester dope composition was prepared in the same manner as the composition disclosed in Example VI of Van Every, except that silicon dioxide particles with an average particle size of 0.2  $\mu\text{m}$  were added to give a particle content of 0.25% by weight in the cellulose ester film to be prepared. The resulting dope was processed in the same manner as in cellulose ester film sample 1 of Example 1 of the present Specification. Thus, cellulose ester film sample 1-2 (inventive) was prepared.

A cellulose ester dope composition was prepared in the same manner as the composition disclosed in Example VI of Van Every, except that silicon dioxide particles with an average particle size of 0.2  $\mu\text{m}$  were added to give a particle content of 0.05% by weight in the cellulose ester film to be prepared. The resulting dope was processed in the same manner as in cellulose ester film sample 1 of Example 1 of the present Specification. Thus, cellulose ester film sample 1-3 (inventive) was prepared.

Herein, the cellulose ester film sample 1-1 (comparative) is closest to the invention, among those which are derived from a combination of Van Every and Snaper, since it is different only in content of silicon dioxide particles from the cellulose ester film sample 1-2

(inventive) or the cellulose ester film sample 1-3 (inventive).

4. The resulting samples were evaluated by haze. Haze of the film samples 1-1, 1-2 and 1-3 was measured, employing a haze turbidimeter NDH-2000 produced by Nippon Denshoku Industries Co., Ltd. Herein, a film sample with a haze of not less than 0.5% cannot be applied to a polarizing plate or a liquid crystal display, since it results in lowering of image contrast. The results are shown in Table 2.

Table 2

| Film sample used  | Particle content of film sample (% by weight) | Haze of film sample |
|-------------------|---|---------------------|
| 1-1 (Comparative) | 0.5   | 1.0%                |
| 1-2 (Inventive)   | 0.25  | 0.25%               |
| 1-3 (Inventive)   | 0.05  | 0.21                |

As is apparent from Table 2 above, the inventive film samples 1-2 and 1-3 exhibited reduced haze as compared with comparative film sample 101. Particularly, the comparative film sample 101 exhibited a haze of 1.0%, which cannot be applied to a polarizing plate or a liquid crystal display. Thus, the inventive samples exhibit greatly improved result as compared with the comparative sample which is the closest prior art. The result is unexpected to one of ordinary skill in the art, and it would not have been obvious to one of ordinary skill in the art to attain the invention over the cited references. Accordingly, we believe that instant claims 1 to 10 and claims 19 to 21 are in a situation of allowability.

I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001, of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Dated: February 18, 2004

Kunio Shimizu  
KUNIO SHIMIZU